IN THE CLAIMS:

Claims 1-49 (canceled)

50. (Previously presented) A method of recovering zinc from a zinc bearing sulphide mineral slurry which includes the steps of:

(a) subjecting the slurry in a reactor to a bioleaching process at a temperature in excess of 45°C;

(b) supplying a feed gas which contains in excess of 85% oxygen by volume, to the slurry;

(c) controlling the dissolved oxygen concentration in the slurry at a level of from 0.2 x $10^{-3}$ kg/$m^3$ to 10 x $10^{-3}$ kg/$m^3$ by controlling at least one of the following: the oxygen content of the feed gas, the supply of feed gas to the slurry; the rate of feed of slurry to the reactor; and

(d) recovering zinc from a bioleach residue of the bioleaching process.

51. (Previously presented) The method according to claim 50 further including removing copper from said bioleach residue before recovering zinc therefrom.

52. (Previously presented) The method according to claim 50 further including removing iron from said bioleach residue before recovering zinc therefrom.

53. (Previously presented) The method according to claim 52 further including precipitating the iron from said bioleach residue by adding limestone to the residue.

54. (Previously presented) The method according to claim 50 furthering including subjecting said bioleach residue to a recovery process which includes zinc solvent extraction and zinc electrowinning to produce zinc metal cathodes.

55. (Previously presented) The method according to claim 54 further including feeding oxygen generated during zinc electrowinning to said feed gas of step (b) or directly to said slurry.

56. (Previously presented) The method according to claim 54 supplying raffiinate, produced during the zinc solvent extraction, to at least one of the following: the bioleaching process of step (a), an external heap leach process, and a zinc oxide leach stage.

57. (Previously presented) The method according to any one of claims 54 further including neutralizing acid in raffinate, produced during the zinc solvent extraction, to produce gypsum and carbon dioxide, and to precipitate co-leached iron.

58. (Previously presented) The method according to claim 57 wherein the step of neutralizing is effected by adding limestone or zinc oxide ore or concentrate to the raffinate.

59. (Previously presented) The method according to claim 57 further including supplying at least some of the carbon dioxide to said bioleaching process of step (a).

60. (Previously presented) The method according to claim 50 further including subjecting said bioleach residue to zinc dust purification by precipitation and electrowinning to produce zinc metal cathodes.

61. (Previously presented) The method according to claim 60 further including supplying spent electrolyte from the zinc electrowinning to at least one of the following: the bioleaching process of step (a), an external heap leach process, and a zinc oxide leach stage.

62. (Previously presented) The method according to claim 60 further including feeding oxygen generated during zinc electrowinning to the feed gas of step (b), or directly to said slurry.

63. (Previously presented) The method according to claim 60 further including neutralizing spent electrolyte, from the zinc electrowinning, to produce gypsum and carbon dioxide, and to precipitate co-leached iron.

64. (Previously presented) The method according to claim 63 wherein said step of neutralizing is effected by adding limestone or zinc oxide ore or concentrate to the spent electrolyte.

65. (Previously presented) The method according to claim 63 further including supplying at least some of the carbon dioxide to the bioleaching process of step (a).

66. (canceled)

67. (Previously presented) The method according to claim 50 further including controlling a carbon content of said slurry.

68. (Previously presented) The method according to claim 50 further including controlling a carbon dioxide content of said feed gas in a range of from 0.5% to 5.0% by volume.

69. (previously presented) The method according to claims 50 wherein the said bioleaching process is carried out at a temperature in a range of from 45°C to 100°C.

70. (Previously presented) The method according to claim 69 wherein said bioleaching process is carried out at a temperature in a range of from 60°C to 85°C.

71. (currently amended) The method according to claim 50 further including bioleaching said slurry ~~at a temperature of up to 45°C~~ using mesophile microorganisms.

72. (Previously presented) The method according to claim 71 wherein said microorganisms are selected from the genus group comprising *Acidithiobacillus; Thiobacillus; Leptosprillum; Ferromicrobium;* and *Acidiphilium.*

73. (Previously presented) The method according to claim 72 wherein said microorganisms are selected from the group comprising *Acidithiobacillus caldus; Acidithiobacillus thiooxidans; Acidithiobacillus ferrooxidans; Acidithiobacillus acidophilus; Thiobacillus prosperus; Leptospirillum ferrooxidans; Ferromicrobium acidophilus;* and *Acidiphilium cryptum.*

74. (Previously presented) The method according to claim 50 including bioleaching said slurry at a temperature of from 45°C to 60°C using moderate thermophile microorganisms.

75. (Previously presented) The method according to claim 74 wherein said microorganisms are selected from the genus group comprising *Acidithiobacillus; Acidimicrobium; Sulfobacillus; Ferroplasma ;* and *Alicyclobacillus.*

76. (Previously presented) The method according to claim 75 wherein said microorganisms are selected from the group comprising *Acidithiobacillus caldus; Acidimicrobium ferrooxidans; Sulfobacillus acidophilus; Sulfobacillus disulfidooxidans; Sulfobacillus thermosulfidooxidans; Ferroplasma acidarmanus; Thermoplasma acidophilum;* and *Alicyclobacillus acidocaldrius.*

77. (Previously presented) The method according to claim 70 further including bioleaching said slurry at a temperature of from 60°C to 85°C using thermophilic microorganisms.

78. (Previously presented) The method according to claim 77 wherein said microorganisms are selected from the genus group comprising *Acidothermus; Sulfolobus; Metallosphaera; Acidianus; Ferroplasma; Thermoplasma;* and *Picrophilus.*

79. (Previously presented) The method according to claim 78 wherein said microorganisms are selected from the group comprising *Sulfolobus metallicus; Sulfolobus acidocaldarius; Sulfolobus thermosulfidooxidans; Acidianus infernus; Metallosphaera sedula; Ferroplasma acidarmanus; Thermoplasma acidophilum; Thermoplasma volcanium;* and *Picrophilus oshimae.*

80. (Previously presented) A plant for recovering zinc from a zinc bearing sulphide mineral slurry which includes a reactor vessel, a source which feeds a zinc bearing sulphide mineral slurry to the vessel wherein a bioleaching process is carried out at a temperature in excess of 45°C, an oxygen source which supplies oxygen in the form of substantially pure oxygen to the slurry, a device which measures the dissolved oxygen concentration in the slurry in the vessel, a control mechanism whereby, in response to the said measure of dissolved oxygen

concentration, the supply of oxygen from the oxygen source to the slurry is controlled to achieve a dissolved oxygen concentration in the slurry at a level of from $0.2 \times 10^{-3}$ kg/m$^3$ to $10 \times 10^{-3}$ kg/m$^3$, and a recovery system which recovers zinc from a bioleach residue from the reactor vessel.

81. (Previously presented) The plant according to claim 80 wherein said reactor vessel is operated at a temperature in excess of 60°C.